REMARKS

Reconsideration of claims 1-10, 22-28 and 32-39, and consideration of new claims 40-51 is respectfully requested. Claim 32 is amended. Claims 11-21 and claims 29-31 are withdrawn as not directed to the elected invention of Group I. Applicants reserve the right to file a divisional application(s) directed to the non-elected claims of Group II. New claim 46 corresponds to the rewriting of objected claim 36 in independent form. New claim 49 corresponds to the rewriting of objected claim 7 in independent form.

Written support for the term "13.2 atomic percent phosphorous" in new claims 40, 42, 44, 47 and 50 is found in Example E. Written support for the term "16.5 atomic percent phosphorous" in new claims 41, 43, 45, 48 and 51 is found in Example A. See, *In re Wertheim*, 541 F.2d 257, 192 U.S.P.Q. 90 (C.C.P.A. 1976)

The rejection of claims 1-4, 8-10, 22-25, 28, 32-35 and 38-39 under the doctrine of obviousness-type double patenting over claims 1 and 2 of U.S. Patent No. 6,573,606 (the '606 patent) is respectfully traversed. Claim 32 is amended. The added term "amorphous" in claim 32 is defined on page 12, lines 4-8 of the application.

The Office Action rejects the claims asserting that the claims are not patentably distinct from claims 1 and 2 of the '606 patent. The claims are said to be generic to claims 1 and 2 of the '606 patent, that is, "a mere broader version of the claimed invention". Applicants respectfully disagree. As explained in the application, applicants' electrodeposited CoWP films are entirely different, *novel* materials than the known electroless films. See, application citations below

Claims 1 and 2 of the '606 patent is directed in-part to a copper interconnect structure with a CoWP cap layer. The CoWP cap layer is formed by an electroless process. The CoWP comprises 86-90 at% cobalt, 1-5 at% tungsten and 6-12 at% phosphorous.[1] The CoWP layer sits atop the copper conductor.

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[1] Applicants point out that the '606 patent describes the composition of the electroless CoWP film in terms of wt%. However, applicants and one of ordinary skill in the art would recognize that the patentee has mistakenly confused wt% with at%. The stated percent ranges reported for the electroless CoWP material are more consistent with at%, not wt%. See, the cited U.S. Lopatin (U.S. 6,528,409) and the article by Kohn (of record).

The Office Action improperly asserts that the rejected claims are a mere broader version of claims 1 and 2 of the '606 patent. The rejected claims do not define some obvious variation of the CoWP films described and claimed in the '606 patent. Rather, the electrodeposited CoWP films offer a wider compositional range of materials, e.g., a phosphorous content greater than 12 at%, not possible with previous electroless CoWP films.

The electrodeposited CoWP films claimed by applicants can have a phosphorus content greater than the 12 at% limit of the electroless CoWP films of the '606 patent. The presently claimed range of 11 at% to 25 at% can only be achieved by the electrodeposition of the CoWP film as explained in the pending application. See, Page 2, lines 5-8; Page 4 line 29 to Page 5, line 1; Page 4 lines 11-13; Page 12-14 Examples A (16.5 at% P); B(24 at% P); E (13.2 at% P); F (25at % P). One of ordinary skill could not possibly achieve the CoWP films as embodied in Examples A, B, E and F (all with a P at% greater than 12%) by electroless deposition. In fact, prior to applicants' electrodeposited CoWP film it was not known to one of ordinary skill how to make a CoWP film with a phosphorous content greater than 12 at%.

Applicants recognize that there is an overlap between the claimed 11 at % to 25 at% phosphorous of the electrodeposited CoWP and the 7 at% to 12 at% phosphorous in the art. However, this amount of overlap does not make the claims obvious under §103. Again, the invention *as a whole* must be considered and the invention here is directed to an electrodeposited CoWP film. A proper obviousness analysis must look at the invention (claims) as a whole. The application on numerous occasions distinguishes an electroless CoWP film known in the art from the electrodeposited film of the invention. *In re Ochiai*, 37 U.S.P.Q.2d 1127 (Fed. Cir. 1995)(Obviosness "requires that one compare the claim's 'subject matter as a whole' with the prior art.")

Applicants' invention is directed to an electrodeposited CoWP film. There is no teaching or suggestion in the art how one of ordinary skill in the art could make an electrodeposited CoWP film. If one took the teachings of the '606 patent, and added the knowledge of one of ordinary skill at the time of the invention, one would certainly not achieve the claimed electrodeposited CoWP films. Electrodeposition provides a route to an entirely different and novel class of materials. If one were to look at the art as a whole at the time of the invention, one

would only find electroless CoWP films. A. Kohn, *in Materials Science and Engineering,* (cited by applicants and of record) indicates that the highest phosphorus content that they could achieve in CoWP film using electroless deposition was 10 at%. Kohn indicates that it is very difficult to achieve P contents greater than 10 at% in an electroless deposited CoWP film. The cited '409 patent indicates the upper limit for phosphorous is 12 at%.

Lastly, in determining whether an invention is obvious the invention in its entirety must be considered. *In re Wright,* 6 U.S.P.Q.2d. 1959 (Fed. Cir. 1988)("[I]t is the invention as a whole that must be considered in obviousness determinations. The invention as a whole embraces the structure, its properties, and the problem it solves.") The structure and properties of the claimed electrodeposited CoWP film is directly related to how the film is made. Also, the applicants recognized that prior electroless CoWP films were limited to 10-12 at% phosphorous. Applicants' solution to extending the phosphorus content beyond 12 at% was electrodeposition. This problem and solution is described in detail in the application.

Accordingly, Applicants respectfully request that the rejection be withdrawn.

The rejection of claims 1-3, 8-10, 22-24, 28, 32-34 and 38-39 under 35 U.S.C. §102(a) as anticipated by Lopatin (U.S. 6,528,409) is respectively traversed. Claim 32 is amended. Like the '606 patent, Lopatin describes a CoWP film with a phosphorous content from 7-12 at%. The CoWP film is again formed by an electroless deposition process.

Applicants do not agree that the term "electrodeposited" is merely a "method recitation in a device claim", as stated in the Office Action. With respect to CoWP films and the teachings as a whole ('606 patent, Kohn, '409 patent all of which indicate an upper limit of electroless deposited CoWP films of 10-12 at %) the term "electrodeposition" actually defines or characterizes a CoWP film with a relatively, high phosphorous content, i.e., to 25 at%. As explained by applicants and the art (see, cited references) such CoWP films cannot be obtained by electroless deposition. The term "electrodeposition" characterizes a CoWP film that is not taught in the art. A reference does not anticipate if it does not describe or enable one of ordinary skill in the art to make what the applicants claim as their invention.

Accordingly, Applicants respectfully request that the rejection be withdrawn.

Application No.: 10/714,966 Docket No.: 20140-00308-US1

Applicants believe the pending application is in condition for allowance.

Please charge our Deposit Account No. 50-0510 under Order No. 20140-00308-US1 from which the undersigned is authorized to draw for any fees due with this Amendment including additional claim fees.

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Respectfully submitted,

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